# Evaluation of Various Cottons (*Gossypium* spp.) for Resistance to *Lygus hesperus* Knight

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## ABSTRACT

A diverse collection of cottons (*Gossypium* spp.) was subjected to various tests in a search for sources of resistance to the plant bug *Lygus hesperus* Knight. Tests included fruit counts on field plantings exposed to lygus bugs versus those protected from lygus bug attack; field cage evaluations of gross population increase in relation to genotype; and greenhouse determinations of survival, growth rate, and oviposition nonpreference by lygus bugs when confined to individual genotypes. When compared with the commercial cultivar standard, Acala SJ-1 and SJ-2, most of the entries were significantly or numerically more susceptible to this pest. Several entries were significantly more resistant by one or more test methods.



KEYWORDS: *Lygus hesperus*, *Gossypium* spp., cotton, pest resistance, Lygus bug, antibiosis, nonpreference, tolerance, genotype, plant resistance.



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# EVALUATIONS OF VARIOUS COTTONS (GOSSYPIUM SPP.) FOR RESISTANCE TO LYGUS HESPERUS KNIGHT[1]

By John H. Benedict, Angus H. Hyer, Thomas F. Leigh, and Ward M. Tingey[2]

## INTRODUCTION

The plant bug *Lygus hesperus* Knight, is the most destructive insect pest of cotton in the San Joaquin Valley of California (Falcon et al. *1971*).[3] This insect has a wide range of native and cultivated plant hosts. As the native hosts on uncultivated lands mature, and the weed and crop hosts are harvested, the bugs move into cottonfields where they may persist for the remainder of the season.

This pest has developed resistance to several insecticides (Leigh et al. *1977*). In addition, all organophosphorous compounds currently registered for application on cotton are broad-spectrum materials that reduce populations of naturally occurring beneficial arthropods. At times, this stimulates outbreaks of insect and mite pests that normally occur at subeconomic levels (Eveleens et al. *1972*). The most important of these secondary pests in the San Joaquin Valley are spider mites, *Tetranychus* spp.; bollworms, *Heliothis zea* (Boddie); cabbage loopers, *Trichoplusia ni* (Hübner); and beet armyworms, *Spodoptera exigua* (Hübner).

The identification and utilization of cotton types more resistant to attack by *L. hesperus* than our present cultivars would provide an ideal method by which to reduce pesticide use. It would also be an excellent complement to natural

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[1]We thank the Rockefeller Foundation for support, in part, administered through a project entitled "Development of Insect Resistance in Cotton to Minimize Use of Insecticides for Control of the Bollworm, *Heliothis zea* (Boddie), and Tobacco Budworm, *Heliothis virescense* (Fabricius)."

[2]Benedict is assistant professor, Department of Entomology, Texas A&M University; Hyer is research agronomist and plant breeder for this project, USDA Cotton Research Station, Shafter, Calif.; Leigh is entomologist and project leader for the Cotton Pest Management-Plant Resistance Project, Department of Entomology, University of California, Davis; and Tingey is assistant professor, Department of Entomology, Cornell, University, New York.

[3]The year in italic, when it follows the author's name, refers to Literature Cited, p. 7.

biological control of secondary pests. This avenue of pest control would be relatively long term, low cost, and consistent with sound environmental principles.

Heritable characters that provide pest resistance have been found in cotton species (Maxwell et al. *1972*, Schuster and Maxwell *1976*, Wilson and Wilson *1975*). Plant characters identified as resistant to one insect species have frequently demonstrated resistance to other species. Based on this knowledge, we designed experiments to evaluate cottons, many of which were known to carry some form of insect resistance, for their effect on *L. hesperus*. Additional studies were conducted to (1) screen various collections of genetic material for new sources of resistance, (2) identify the mechanism(s) of resistance, and (3) field test cottons containing known factors of resistance to *L. hesperus*.

This bulletin is an itemization and summary of the results obtained in all evaluation and screening experiments for which our program yielded meaningful results. Such documentation should be of value to other research workers who undertake plant resistance programs on cotton as they may wish to eliminate more susceptible types from their programs and/or compare data with ours to draw generalizations from their own research.

## EXPERIMENTAL PROCEDURES

Seeds of more than 600 different cottons have been obtained from various sources. Two commercial cultivars from the California breeding program were selected as standards for comparison--Acala SJ-1 for 1973 and Acala SJ-2 for 1974 through 1976. Both standards were entered into several experiments to permit thorough comparison.

### Methods of Greenhouse No-Choice Screening

#### Growth Rate and Survival

Plants for the greenhouse experiments were grown by the methods of Tingey et al. (*1973*) in 954-ml plastic food containers. Tests were carried out when the plants had grown sufficiently to produce four to six sympodial branches with the desired size of squares. To maintain this growth, large squares were removed periodically.

The procedures used in studies of nymphal growth and survival screening were essentially the methods of Tingey et al. (*1975*). Briefly, at 3 days post-ecolsion, nymphs of *L. hesperus* were individually confined to a sympodial branch terminal possessing two or three intact floral buds. Cellulose dialysis tubing cages, 4.8 cm in diameter and 15.2 cm long, were used to enclose one square (floral bud) approximately 3 days preanthesis and one or two squares in earlier stages of development. Dialysis tubing was used because of its light weight, transparency, and permeability to water vapor. A polyurethane foam disk, 5.2 cm in diameter and 2.5 cm thick, was slit radially for attachment to the sympodial branch and used to close one end of the cage. One nymph was placed in the open

end of the cage, which was then folded twice and held closed with a paper clip. After 7 days of confinement, survival and weight were recorded for each nymph. Three nymphs were caged on separate sympodial branches of each plant. The average weight of these three individuals was considered a replicate of cotton genotype; eight replicates represented a genotype.

The response of *L. hesperus* to each experimental genotype was compared with that of the standard commercial Acala cultivar, using analysis of variance and the LSD method (P=.10). Growth data were transformed to $\sqrt{X+.25}$ or $\sqrt{X+.5}$ to satisfy the assumptions of such analysis. The data presented in tables 1 through 4[4] are retransformed values.

## Oviposition and Egg Survival

Oviposition nonpreference and egg survival were measured as one parameter, "nymphal emergence" by the methods of Tingey et al. (*1973*). Using cotton organdy sleeve cages, 20 cm wide by 24 cm long, each plant terminal was enclosed. The cage ends were fitted with Velcro strips to exclude predators and parasites and to retain lygus bugs within the bag. During 1972-74, three females per cage were used. They were removed at the end of 24 h, and the bags were resealed and left on the plants for 10 days. At the end of that period, the terminals were clipped from the plant and taken to the laboratory where the nymphs were counted. During 1975-76, six females per cage were used, and bugs and bags were removed at the end of 24 h. These plants were isolated from one another on greenhouse tables. After a 6-day incubation period, the plants were shaken over white paper and nymphs were counted daily until there was no further hatch--usually about 5 days. Each plant was considered a replicate, and eight replicates represented a genotype. The data were statistically analyzed using analysis of variance (ANOV) and the least significant difference (LSD) test.

Growth rates, survival, and nymphal emergence rates on the standards varied with time of year and the particular greenhouse used. This is due in part to differences in day length and variations in greenhouse temperature. This variation with time of testing is considered to be responsible for the differences in the growth rates and emergence when comparing data between two or more groups since each group was tested at a different time of the year.

## Methods of Field No-Choice Screening: Evaluation of Cotton Genotypes by their Effect on Lygus Bug Gross Population Increase

Individual cotton plants were enclosed in organdy cages. The cages were sealed with Velcro strips at the top and bottom and suspended from a wire support. To prevent entrance of predators and mites, the plant mainstem was wrapped, first with cotton, and then covered with a layer of cotton organdy,

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[4]All tables follow the text, beginning on page 9.

following which the Velcro-lined cage opening was sealed around the cotton and fastened on both sides of the mainstem with plastic clothespins. Each cage was considered a replicate, with each genotype replicated 12 times.

To remove predators and mites, the cage area was first sprayed with chlordimeform[5] (0.45 kg ai/379 L). Two days later, plants were caged. Plants and cages were then thoroughly saturated from within the cage using tepp[6] (0.23 kg ai/379 L), resealed for 4 days, then again thoroughly saturated from within using tepp. Four days later, five female and two male *L. hesperus* were placed in each cage. These field cage populations were allowed to increase for 30 days, at which time the plant was cut at the base leaving the cage on the plant. Caged plants were then placed in a 56- by 120-cm tall drum, and the bugs were anesthetized with chloroform vapor. The bugs were then removed from the cage, counted, and recorded. Data were analyzed utilizing ANOV (analysis of variance) on transformed data, log (X+.5), and means were separated by the LSD test (P=.10).

## Methods of Field Free-Choice Screening: Evaluation of Cotton Genotypes by the Effect of Lygus Bugs on Boll Production

Three experiments were conducted in the field in 1976 with 29, 40, and 41 genotypes. In each experiment, infested plots and check plots were planted in separate randomized blocks with three replications for experiment 1 and two replications for experiments 2 and 3. For each experiment, the infested and control plots lay parallel to each other but were separated by 16 rows (16 m) of buffer cotton. Each plot was one row wide (1 m) by 6.1 m long.

In infested plots, the test genotypes were planted in two adjacent rows. These were bordered on each side by a single row of the glandless G8160 genotype. These, in turn, were bordered by a row of safflower. Thus, the planting configuration was two rows of safflower, one row of glandless G8160 cotton, two rows of test cottons, one row of glandless G8160, two more rows of safflower, one row of G8160, two rows of test cottons, and so forth. Glandless G8160 and safflower were used in the infested plots to enhance lygus bug buildup. The infested plots were sprayed early in June with malathion[7] (1.12 kg ai/ha) to remove natural enemies of lygus bugs. Further stimulation of lygus bug numbers was accomplished by collecting lygus bugs from alfalfa with a tractor mounted vacuum machine (Stern et al. *1965*) and releasing them into infested plots at night. This was done on two occasions. In addition, glandless border rows were sprayed with sucrose at the rate of 20 kg/ha (100 gm/L of water, applied to 182.9 m of row) using a compressed air sprayer. Studies done by Butler (*1968*) in Arizona and by ourselves (unpublished data) indicate that sucrose applications to cotton arrest the movement of *L. hesperus* and increase their numbers.

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[5] *N*'-(4-chloro-*o*-tolyl)-*N*,*N*-dimethylformamidine.
[6] Tetraethyl pyrophosphate.
[7] Diethyl mercaptosuccinate *S*-ester with *O*,*O*-dimethyl phosphorodithioate.

Control test cottons were planted in single row plots without the alternate safflower or glandless genotype interplants. They were treated with methamidophos[8] or acephate[9] at 0.560 kg ai/ha whenever lygus bug counts exceeded 5 per 50 sweeps. Chlordimeform was applied again in June to both control and infested plots to prevent spider mite outbreaks.

All open bolls were counted on each plot in the infested and control blocks after defoliation at season's end. Comparisons of the number of bolls found in the infested plots with the control for each genotype were utilized as the measure of resistance.

## RESULTS AND DISCUSSION

### Laboratory No-Choice Screening

A total of 179 cotton selections from various genetic collections and breeder sources were evaluated for resistance to *L. hesperus* in greenhouse experiments. Growth rate, survival, and combined ovipositional nonpreference-egg survival parameters are reported in tables 1 through 4. When compared with the standard Acala cultivars, 27 of these genotypes were found significantly more resistant for at least one parameter, while 54 were significantly more susceptible to *L. hesperus*. Two genotypes demonstrated resistance as both reduced growth rate and survival and one as reduced growth rate and oviposition nonpreference.

Although not statistically significant, a number of additional selections ranked better than the standards. Some of these may carry useful levels of resistance, but will require further evaluation.

The three types of tests measured the impact of the various cotton genotypes on *L. hesperus* physiology and egg-laying preference, which reflects antibiosis and nonpreference, respectively. As with most resistance factors, the mechanism of resistance was not immediately apparent; however, we found that in one experiment the very pilose UCD #23 (SA-117 pilose) reduced nymphal growth rate while it enhanced oviposition rate (tables 1 and 4). In other experiments, trends for pilose were similar, though not significant. While not significant, the pilose entry UCD #618 (TM-1) yielded similar reduction in growth rate and a significant increase in oviposition. We suspect that plant hairs of pilose genotypes interfere with nymphal mobility, as reported by Smith et al. (*1975*) for pink bollworms, and feeding. Conversely, growth rate and survival on smooth cottons, UCD 86 and 617 ($D_2$ smooth and TM-1 smooth, respectively), increased when compared with the standard Acala cottons or pilose types.

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[8] *O,S*-dimethyl phosphoramidothioate.
[9] *O,S*-dimethyl acetylphosphoramidothioate.

Trichome density also appears to have a great influence on *L. hesperus* preference for egg laying. Female *L. hesperus* were found to deposit more eggs on hairy SA-117 and TM-1 Pilose cotton than on smooth $D_2$ and TM-1 normal cotton. As with other characters for resistance, the response of *L. hesperus* to the smooth and/or pilose character is greatly influenced by other background features. Our research suggests that the oviposition nonpreference for smooth cottons may compensate for their greater susceptibility to nymphal survival and growth.

## Field No-Choice Screening

Three isogenic or near isogenic pairs of cotton, thought to differ only in the presence or absence of extra floral nectaries (Meyer and Meyer *1960*) were tested for gross population increase. They were found to exhibit varying degrees of resistance (table 5), which is probably due to differences in background characters among Stoneville, Acala, and Deltapine cottons. The nectariless Acala and Stoneville isolines suppressed *L. hesperus* population growth more than their respective nectaried isolines. While similar results were expected with the Deltapine, there was no significant difference. The most resistant lines appear to be the nectariless Acala cottons.

## Field Free-Choice Screening

Using boll counts at the end of the season as a measure of resistance should reflect the cumulative effect of the three types of resistance--antibiosis, nonpreference, and tolerance. They may also indicate escape and compensatory fruiting by the plant. In using this method, cottons that have a great ability to replace squares (flower buds) lost to lygus bug feeding would appear resistant. This compensation should be distinguished from deterred damage through some other resistance mechanism. Further testing is required to determine the nature of resistance for cottons found to be most fruitful (resistant) in these experiments. Since the measure of resistance used in these tests (tables 6 to 8) is the ratio of the number of bolls in infested plots to that in the check plots (I/C), the larger this ratio, the greater the relative level of resistance.

Of the 110 entries tested in the three experiments reported here, only 15 had significantly fewer bolls in the infested plots than in the check plots. In general, a 20 percent reduction in boll number was needed for significant differences to be detected. More refined experimental methods would probably detect smaller differences. Boll reduction in infested plots versus check plots of the test standard (Acala SJ-2) varied only from 1 to 8 percent. This small loss, which was less than expected, may have been due to the effects of compensatory fruiting.

## SUMMARY

Cotton lines carrying heritable characters to resist attack by *L. hesperus* have been identified and quantified in no-choice and free-choice situations. The smooth character reduced egg laying by about 30 percent, depending upon background, but increased growth rate and survival. Conversely, the pilose character increased egg laying but decreased growth rate and survival. The nectariless character appears outstanding as a source of resistance to *L. hesperus*. Based on population buildup, nectariless cotton appears to suppress population increase by about 30 percent (table 6) when in the Acala background.

Unknown sources of chemical resistance were identified by reduced growth rates and/or increased survival encountered on certain cotton lines. When these chemicals are identified and/or methods are devised for screening crosses in breeding stock, these too could be used to increase the resistance of commercial varieties--including a glandless variety.

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Table 1.--*Growth, survival and emergence of* Lygus hesperus *nymphs in no-choice greenhouse tests. U.S. Cotton Research Station, Shafter, Calif., 1973*

| UCD No. | Genotype | Growth[1] | Survival[2] | Emergence[1] |
|---|---|---|---|---|
| | **Group 1** | | | |
| | | *Mg/day* | *Percent* | *Nymphs/ female* |
| 237 | Acala SJ-1 (Test Standard) | 0.43 | 73 | 6.1 |
| 121 | NO097 TSA(66)9 African | .41 | 67 | 7.5 |
| 122 | Tanguis 3807 | .14* | 47* | 6.8 |
| 123 | TX 27 x M8 (1-21) | .29 | 80 | 6.5 |
| 124 | TX 44 *Gossypium hirsutum punctatum* (Chiapas, Mexico) | .26* | 93 | 4.7 |
| 125 | Pima S-4 (*G. barbadense*) | .14* | 73 | 6.9 |
| 126 | Deltapine 14 normal bract (H7100C & H7112B) N | .54 | 87 | 7.9 |
| 127 | Deltapine 14 Frego bract (H7099A & H7109C) F | .50 | 93 | 11.1* |
| 128 | SA33 Hopi | .66* | 93 | 9.9* |
| 129 | X771Y5g | .60 | 93 | 4.3 |
| 130 | Acala 1517V | .56 | 93 | 11.1* |
| 131 | 247-1-6 (High gossypol, glabrous, nectariless) | .30 | 40* | 5.4 |
| 133 | TX 116 *G. hirsutum latifolium* (Guatemala) | .41 | 60 | 4.1 |
| 134 | TX 466 *G. hirsutum latifolium* | .29 | 67 | 2.8* |
| 135 | TX 110 *G. barbadense* (Guatemala) | .07* | 67 | 5.7 |
| 136 | H7020-1 (Triple Hybrid, bulkcross #2, 1952) | .49 | 93 | 13.8* |
| 140 | H7033-4 (Pima S-1 x *G. barbadense* RNR 2x AxTE 1 gs, $F_4$) | .40 | 87 | 6.6 |
| 141 | H2015 (Nectariless Acala) | .52 | 53 | 4.7 |
| 540 | G8160 (Glandless Acala) | .50 | 93 | 10.6 |
| CV (percent) | | 8.8 | 31.4 | 22.5 |

See footnotes at end of table.

Table 1.--*Growth, survival and emergence of* Lygus hesperus *nymphs in no-choice greenhouse tests. U.S. Cotton Research Station, Shafter, Calif., 1973*--Continued

| UCD No. | Genotype | Growth[1] | Survival[2] | Emergence[1] |
|---|---|---|---|---|
| | | Group 2 | | |
| | | *Mg/day* | *Percent* | *Nymphs/ female* |
| 237 | Acala SJ-1 (Test Standard) | 0.63 | 75 | 7.3 |
| 17 | *G. arboreum* ($A_2$-15) | .47 | 75 | 6.8* |
| 23 | SA-117 Pilose | .30* | 50 | 10.8 |
| 86 | $D_2$ Smooth Leaf, glandless | .81 | 58 | 2.4* |
| 108 | TX 542 $H_1$ $H_1$ | .66 | 92 | 6.3 |
| 109 | TX 423 $H_2$ $H_2$ | .66 | 67 | -- |
| 137 | H7021-2 (Triple Hybrid, bulkcross #2, 1952) | .53 | 58 | 7.1 |
| 138 | H7023-1 (Triple Hybrid, bulkcross #2, 1952) | .48 | 92 | 3.5* |
| 142 | M8 x TX 27 (1-21-6-10) | .59 | 68 | 3.4* |
| 143 | HG 6-1-1-144 (High gossypol) | .53 | 58 | 3.4* |
| 144 | Hopi NM 59-581 | .55 | 67 | 6.9 |
| 145 | SLP #1 | .72 | 75 | 4.3 |
| 146 | Stoneville 7A nectariless | .40* | 75 | 4.2 |
| 147 | Bayou SM-6 | .60 | 100 | 4.7 |
| 148 | T 254-24-14 (9-55-1) X-Factor | .46 | 33* | 5.2 |
| 149 | T 254-24-14 (9-55-7) X-Factor | .44 | 67 | 5.8 |
| 150 | Atrophied bract (320551, 1968) | .52 | 83 | 2.9* |
| 151 | H7001-1 (Tanguis x Acala 4-42[4] BC) | .48 | 100 | 5.6 |
| 152 | H7003-1 (Tanguis x Acala 4-42[2] BC) | .76 | 83 | 4.4 |
| 154 | H7026-1 (Acala 4-42 x Tanguis $F_7$) | .49 | 92 | 5.4 |
| 156 | H7046-1 (AxTE 1 "gs" x 12302) x (4-42 x Tanguis)$F_5$ | .40* | 83 | 5.4 |
| | CV (percent) | 9.5 | 32.7 | 28.8 |

**Group 3**

| | | | | |
|---|---|---|---|---|
| 237 | Acala SJ-1 (Test Standard) | .58 | 75 | 5.7 |
| 250 | SA-16 heavy spot clean yellow anther | 1.01* | 83 | 3.5 |
| 251 | SA-18 Arkansas 17 (yellow anther) | .85* | 75 | 4.3 |
| 260 | SA-42 Clarkdale red | .72 | 83 | 5.4 |
| 264 | SA-53 Cook 912 Pope Clean Seed | .98* | 92 | 3.0 |
| 272 | SA-72 Mars Rose Cluster | .61 | 58 | 4.3 |
| 278 | SA-85 Black Arm Resistant x 16 (Fine) | .65 | 42 | 4.9 |
| 299 | SA-166 M.U. 8B VA 7-44 | .74 | 75 | 3.8 |
| 303 | SA-177 Arkansas Clean Seed VA 8-12 | .52 | 100 | 2.8 |
| 324 | SA-253 Coker's Clevewilt 3 | .76 | 100 | 1.6 |
| 327 | SA-269 Cook's 144-68 | .81* | 83 | 7.0 |
| 352 | SA-373 Express 432 | .80* | 92 | 2.0 |
| 353 | SA-378 Stoneville x Hopi 11-1-1-4 | .75 | 75 | 8.9 |
| 376 | SA-451 Coker 100 Wilt | .84* | 83 | 4.6 |
| | CV (percent) | 6.8 | 32.9 | 34.1 |

**Group 4**

| | | | | |
|---|---|---|---|---|
| 237 | Acala SJ-1 (Test Standard) | .19 | 58 | 9.1 |
| 168 | T859 | .13 | 67 | 4.5 |
| 226 | G8628 Gd (Acala 4-42-77 glanded) | .15 | 67 | 9.6 |
| 227 | G8628 Gs (Acala 4-42-77 glandless) | .29 | 83 | 9.1 |
| 228 | Stoneville 7A Frego bract | .18 | 83 | 8.4 |
| 229 | Stoneville 7A (normal bract) | .33 | 42 | 7.2 |
| 232 | G1831 Gd (Acala SJ-1 glanded) | .24 | 50 | 9.2 |
| 233 | G1831 Gs (Acala SJ-1 glandless) | .26 | 100* | 11.7 |
| | CV (percent) | 8.0 | 35.0 | 26.1 |

See footnotes at end of table.

Table 1.--*Growth, survival and emergence of* Lygus hesperus *nymphs in no-choice greenhouse tests. U.S. Cotton Research Station, Shafter, Calif., 1973*--Continued

| UCD No. | Genotype | Growth[1] | Survival[2] | Emergence[1] |
|---|---|---|---|---|
| | | Group 5 | | |
| | | *Mg/day* | *Percent* | *Nymphs/ female* |
| 237 | Acala SJ-1 (Test Standard) | 0.12 | 75 | 10.5 |
| 36 | TX 14 *G. hirsutum richmondi* (Oaxaco, Mexico) | -- | -- | 7.7 |
| 37 | TX 18 *G. hirsutum richmondi* (Chiapas, Mexico) | -- | -- | 8.2 |
| 42 | TX 239 *G. hirsutum latifolium* (Guatemala) | -- | -- | 9.2 |
| 180 | Acala P18C | .22 | 58 | 6.1 |
| 378 | SA 460 Deltapine 14 (44-51) | .13 | 58 | 8.2 |
| 429 | SA 710 Arkansas 3 | .11 | 58 | 9.7 |
| 464 | SA 968 Saenz Pena 61 | .12 | 58 | 8.0 |
| 470 | SA 1035 SLS 1000 | .13 | 58 | 10.0 |
| 474 | SA 1053 108F | -- | -- | 9.4 |
| 482 | SA 1083 A.M. 7 | .27* | 42 | 9.4 |
| 483 | SA 1085 CB 3031 | .09 | 67 | 6.9 |
| 486 | NO095 RSA (G8) 32 African | -- | -- | 8.7 |
| 487 | Acala SJ-2 | .20 | 50 | 10.0 |
| 488 | Acala SJ-3 | .39* | 58 | 10.5 |
| 489 | Acala SJ-4 | .18 | 67 | 10.3 |
| CV (percent) | | 6.8 | 42.8 | 26.1 |

Group 6

| | | | | |
|---|---|---|---|---|
| 237 | Acala SJ-1 (Test Standard) | .22 | 75 | 7.3 |
| 181 | Delcot 277 | .36* | 58 | 7.8 |
| 182 | Deltapine 16 | .33 | 92 | 8.8 |
| 496 | DES-HERB 16 | .10* | 83 | 12.2 |
| 497 | DES-HERB 277 | .16 | 92 | 10.9 |
| 498 | DES-HAMS 16 | .09* | 67 | 6.8 |
| 499 | DES-HAMS 277 | .12 | 58 | 9.5 |
| 500 | DES-HAF 16 | .22 | 83 | 8.4 |
| 501 | DES-HAF 277 | .12 | 75 | 7.9 |
| 502 | DES-TOM 16 | .18 | 58 | 10.0 |
| 503 | DES-TOM 277 | .40* | 83 | 8.4 |
| 504 | DES-ANOM 16 | .27 | 58 | 7.3 |
| 505 | DES-ANOM 277 | .25 | 92 | 10.0 |
| 506 | DES-ARB 16 | .15 | 58 | 9.2 |
| 507 | DES-ARB 277 | .37* | 83 | 9.0 |
| 508 | DES-BARB 16 | .37* | 83 | 12.1 |
| 509 | DES-BARB 277 | .39* | 83 | 6.9 |
| 510 | DES-LONG 16 | .05* | 33* | 9.6 |
| 511 | DES-LONG 277 | .08* | 83 | 13.0 |
| 6 | *G. thurberi* | -- | -- | 2.9* |
| 193 | TX 144 *G. hirsutum punctatum* (Guatemala) | -- | -- | 7.9 |
| 202 | TX 308 (Guerrero, Mexico) | -- | -- | 3.7 |
| | CV (percent) | 6.7 | 33.1 | 26.3 |

See footnotes at end of table.

Table 1.--*Growth, survival and emergence of* Lygus hesperus *nymphs in no-choice greenhouse tests. U.S. Cotton Research Station, Shafter, Calif., 1973*--Continued

| UCD No. | Genotype | Growth[1] | Survival[2] | Emergence[1] |
|---|---|---|---|---|
| | | | | |
| | **Group 7** | | | |
| | | *Mg/day* | *Percent* | *Nymphs/ female* |
| 237 | Acala SJ-1 (Test Standard) | 0.35 | 58 | 10.1 |
| 491 | Pima S-4 | .21 | 42 | 6.6 |
| 492 | 72-4054 (Glandless Pima) | .36 | 75 | 8.6 |
| 493 | 72-4056 (Glandless Pima) | .41 | 83 | 6.7 |
| 494 | 72-4058 (Glandless Pima) | .46 | 92* | 9.1 |
| 495 | 72-4062 (Glandless Pima) | .45 | 83 | 6.8 |
| CV (percent) | | 10.5 | 31.4 | 22.4 |
| | **Group 8** | | | |
| 237 | Acala SJ-1 (Test Standard) | .33 | 58 | 8.3 |
| 39 | TX 36 *G. hirsutum latifolium* (Chiapas, Mexico) | .92* | 75 | 8.3 |
| 162 | N6072 | .45 | 75 | 14.5 |
| 196 | TX 375 *G. hirsutum latifolium* (Paraguay) | .38 | 83 | 13.1 |
| 252 | SA 19 Acala 37 (yellow anther) | .34 | 67 | 12.4 |
| 285 | SA 108 Acala short sympodia | .42 | 67 | 8.3 |
| 295 | SA 155 Hindi Weed RA 8-24 | .36 | 83 | 11.6 |
| 349 | SA 357 Mexican B.B. | .66* | 50 | 13.0 |
| 350 | SA 358 Mexican | .70* | 83 | 11.3 |
| 356 | SA 389 Acala 911 P1-1 | .61* | 92 | 10.2 |
| 426 | SA 675 green linted pigmentation | .41 | 100 | 10.1 |
| 444 | SA 895 S.I. x Spears Green | .42 | 75 | 11.9 |
| 481 | SA 1082 Timok 811 | .52* | 92 | 11.5 |
| CV (percent) | | 7.7 | 31.3 | 18.5 |

## Group 9

| | | | | |
|---|---|---|---|---|
| 237 | Acala SJ-1 (Test Standard) | .41 | 83 | 15.3 |
| 293 | SA 143 Mexican Naked UA 3-3 | .58 | 83 | 16.3 |
| 301 | SA 171 Acala Okra VA 2-4 | .70 | 83 | 14.9 |
| 320 | SA 238 Acala 1064 (New Mexico) | .53 | 78 | 15.5 |
| 321 | SA 240 Acala Red Okra | .32 | 75 | 13.6 |
| 331 | SA 281 Hopi Moencopi | .58 | 67 | 11.9 |
| 343 | SA 333 Uganda B31 | .56 | 100 | 19.3 |
| 366 | SA 421 Mexican Acala Clean Seed | .42 | 67 | 7.8* |
| 374 | SA 442 Acala Young's | .53 | 67 | 14.8 |
| 375 | SA 445 Acala N 28-5 | .66 | 75 | 15.0 |
| 433 | SA 848 White Gold Wilt | .48 | 83 | 12.3 |
| 446 | SA 903 PI 1944833 KP 28 | .39 | 83 | 18.2 |
| 447 | SA 904 PI 194831 B 181 | .41 | 67 | 14.5 |
| 448 | SA 905 PI 194832 BP52, MB2 | .54 | 83 | 14.7 |
| | CV (percent) | 9.0 | 35.1 | 14.7 |



## Group 10

| | | | | |
|---|---|---|---|---|
| 237 | Acala SJ-1 (Test Standard) | .34 | 75 | -- |
| 168 | T859 | .30 | 83 | -- |
| 180 | Acala P18C | .40 | 83 | -- |
| 226 | G8628 Gd (Acala 4-42-77 glanded) | .34 | 83 | -- |
| 227 | G8628 Gs (Acala 4-42-77 glandless) | .33 | 83 | -- |
| 228 | Stoneville 7A Frego bract | .35 | 75 | -- |
| 229 | Stoneville 7A (normal bract) | .25 | 67 | -- |
| 232 | G1831 Gd (Acala SJ-1 glanded) | .34 | 50 | -- |
| 233 | G1831 Gs (Acala SJ-1 glandless) | .56* | 83 | -- |
| 310 | SA 203 *G. barbadense* Tashkent | .08* | 75 | -- |
| 378 | SA 460 Deltapine 14 (44-51) | .40 | 100 | -- |
| 464 | SA 968 Saenz Pena 61 | .29 | 67 | -- |
| 487 | Acala SJ-2 | .21 | 75 | -- |
| 488 | Acala SJ-3 | .25 | 89 | -- |
| 489 | Acala SJ-4 | .37 | 67 | -- |
| | CV (percent) | 7.2 | 35.1 | |

See footnotes at end of table.

Table 1.--*Growth, survival and emergence of* Lygus hesperus *nymphs in no-choice greenhouse tests. U.S. Cotton Research Station, Shafter, Calif., 1973*--Continued

| UCD No. | Genotype | Growth[1] | Survival[2] | Emergence[1] |
|---|---|---|---|---|
| | | **Group 11** | | |
| | | *Mg/day* | *Percent* | *Nymphs/ female* |
| 237 | Acala SJ-1 (Test Standard) | -- | -- | 8.0 |
| 540 | G8160 (Glandless Acala) | -- | -- | 10.8 |
| 162 | N6072 | -- | -- | 6.7 |
| 180 | Acala P18C | -- | -- | 8.2 |
| 238 | H1016 (Nectariless Acala) | -- | -- | 6.7 |
| 512 | Auburn 623A RNR | -- | -- | 10.2 |
| | CV (percent) | | | 26.0 |

[1]Original data transformed to $(x + 0.25)^{\frac{1}{2}}$ or $(x + 0.5)^{\frac{1}{2}}$ and statistically analyzed using analysis of variance (ANOV). Retransformed means reported here.

[2]Original data statistically analyzed using ANOV.

*Significantly different from test standard at 10-percent probability level.

Note: Dashes indicate genotypes that were not entered into these lists.

Table 2.--*Growth, survival and emergence of* Lygus hesperus *nymphs in no-choice greenhouse tests. U.S. Cotton Research Station, Shafter, Calif., 1974*

| UCD No. | Genotype | Growth[1] | Survival[2] | Emergence[1] |
|---|---|---|---|---|
| | | | | |
| | **Group 1** | | | |
| | | *Mg/day* | *Percent* | *Nymphs/ female* |
| 487 | Acala SJ-2 (Test Standard) | 0.40 | 92 | 14.9 |
| 513 | DPL $16^3$ x TX 25 BC | .56* | 90 | 15.5 |
| 514 | DPL $16^3$ x TX 495 BC | .72* | 89 | 16.8 |
| 515 | DPL $16^3$ x TX 195 BC | .69* | 86 | 14.7 |
| 516 | DPL $16^3$ x TX 25 BC | .51 | 94 | 14.5 |
| 517 | DPL $16^3$ x TX 59 BC | .67* | 75 | 16.2 |
| 518 | DPL $16^3$ x TX 113 BC | .50 | 92 | 16.7 |
| 538 | DPL 16 Nectariless | .66* | 50 | 12.6 |
| | CV (percent) | 12.4 | 32.2 | 14.5 |
| | **Group 2** | | | |
| 487 | Acala SJ-2 (Test Standard) | .45 | 67 | 6.5 |
| 519 | DPL $16^3$ x TX 201 BC | .44 | 100 | 7.0 |
| 520 | DPL $16^3$ x TX 69 BC | .48 | 94 | 5.3 |
| 521 | DPL $16^3$ x TX 88 BC | .45 | 77 | 3.9 |
| 522 | DPL $16^3$ x TX 91 BC | .39 | 94 | 4.1 |
| 523 | DPL $16^3$ x TX 87 BC | .48 | 94 | 5.2 |
| 524 | DPL $16^3$ x TX 223 BC | .53 | 92 | 6.8 |
| 539 | DPL 16 | .67* | 75 | 4.7 |
| | CV (percent) | 13.1 | 30.4 | 28.6 |

See footnotes at end of table.

Table 2.--*Growth, survival and emergence of* Lygus hesperus *nymphs in no-choice greenhouse tests. U.S. Cotton Research Station, Shafter, Calif., 1974*--Continued

| UCD No. | Genotype | Growth[1] | Survival[2] | Emergence[1] |
|---|---|---|---|---|
| | **Group 3** | | | |
| | | *Mg/day* | *Percent* | *Nymphs/ female* |
| 487 | Acala SJ-2 (Test Standard) | 0.50 | 100 | 5.7 |
| 525 | DPL $16^3$ x TX 80 BC | .37 | 81 | 2.1* |
| 526 | DPL $16^3$ x TX 66 BC | .55 | 100 | 2.0* |
| 527 | DPL $16^3$ x TX 100 BC | .50 | 69 | 1.6* |
| 529 | DPL $16^3$ x TX 75 BC | .47 | 72 | 1.6* |
| 530 | DPL $16^3$ x TX 158 BC | .66 | 71 | 1.4* |
| 531 | DPL $16^3$ x TX 209 BC | .54 | 81 | 2.5* |
| CV (percent) | | 15.5 | 37.6 | 37.9 |
| | **Group 4** | | | |
| 487 | Acala SJ-2 (Test Standard) | .26 | 90 | 7.9 |
| 532 | DPL $16^3$ x TX 78 BC | .34 | 81 | 3.6 |
| 533 | DPL $16^3$ x TX 223 BC | .36 | 86 | 9.6 |
| 534 | DPL $16^3$ x TX 25 BC | .24 | 80 | 9.3 |
| 535 | DPL $16^3$ x TX 84 BC | .33 | 85 | 9.4 |
| 536 | Stoneville 7A Nectariless | .23 | 50 | 6.9 |
| 537 | Stoneville 7A | .30 | 82 | 5.9 |
| CV (percent) | | 19.2 | 36.2 | 32.2 |

[1]Original data transformed to $(x + 0.25)^{\frac{1}{2}}$ or $(x + 0.5)^{\frac{1}{2}}$ and statistically analyzed using analysis of variance (ANOV). Retransformed means reported here.

[2]Original data statistically analyzed using ANOV.

*Significantly different from test standard at 10-percent probability level.

Table 3.--*Growth, survival and emergence of* Lygus hesperus *nymphs in no-choice greenhouse tests. U.S. Cotton Research Station, Shafter, Calif., 1975*

| UCD No. | Genotype | Growth[1] | Survival[2] | Emergence[1] |
|---|---|---|---|---|
| | **Group 1** | | | |
| | | *Mg/day* | *Percent* | *Nymphs/ female* |
| 487 | Acala SJ-2 (Test Standard) | 0.36 | 83 | 13.7 |
| 516 | DPL $16^3$ x TX 25 BC | .46 | 79 | 12.7 |
| 521 | DPL $16^3$ x TX 88 BC | .58* | 85 | 16.1 |
| 524 | DPL $16^3$ x TX 223 BC | .44 | 85 | 12.5 |
| 536 | Stoneville 7A Nectariless | .42 | 77 | 13.0 |
| 537 | Stoneville 7A | .46 | 83 | 12.5 |
| 538 | DPL 16 Nectariless | .56* | 83 | 10.5 |
| 539 | DPL 16 | .61* | 92 | 12.6 |
| CV (percent) | | 15.3 | 27.9 | 20.6 |
| | **Group 2** | | | |
| 487 | Acala SJ-2 (Test Standard) | .39 | 75 | 11.2 |
| 525 | DPL $16^3$ x TX 80 BC | .54* | 92 | 13.7 |
| 526 | DPL $16^3$ x TX 66 BC | .51 | 87 | 14.7* |
| 527 | DPL $16^3$ x TX 100 BC | .72* | 100 | 11.6 |
| 529 | DPL $16^3$ x TX 75 BC | .66* | 90 | 11.2 |
| 530 | DPL $16^3$ x TX 158 BC | .66* | 87 | 6.9* |
| 531 | DPL $16^3$ x TX 209 BC | .66* | 85 | 6.8* |
| 535 | DPL $16^3$ x TX 84 BC | .61* | 93 | 8.7 |
| CV (percent) | | 14.6 | 20.5 | 14.0 |

See footnotes at end of table.

Table 3.--*Growth, survival and emergence of* Lygus hesperus *nymphs in no-choice greenhouse tests. U.S. Cotton Research Station, Shafter, Calif., 1975*--Continued

| UCD No. | Genotype | Growth[1] | Survival[2] | Emergence[1] |
|---|---|---|---|---|
| | **Group 3** | | | |
| | | *Mg/day* | *Percent* | *Nymphs/ female* |
| 487 | Acala SJ-2 (Test Standard) | 0.52 | 73 | 5.2 |
| 13 | CAL 2 | .50 | 79 | 6.3 |
| 15 | Triple Hybrid 386-30 | .70* | 83 | 6.1 |
| 44 | Carver 3-1-10 | .57 | 90 | 7.3 |
| 514 | DPL $16^3$ x TX 495 BC | .69* | 87 | 5.9 |
| 528 | DPL $16^3$ x TX 106 BC | .57 | 96 | 6.9 |
| 541 | Acala SJ-5 | .64 | 96 | 6.5 |
| 36 | TX 14 *G. hirsutum richmondi* (Oaxaca, Mexico) | -- | -- | 5.6 |
| | CV (percent) | 12.4 | 21.0 | 20.6 |
| | **Group 4** | | | |
| 487 | Acala SJ-2 (Test Standard) | .39 | 83 | 6.7 |
| 224 | M8 (hirsute) | .47 | 71 | 7.3 |
| 517 | DPL $16^3$ x TX 59 BC | .35 | 79 | 7.6 |
| 518 | DPL $16^3$ x TX 113 BC | .44 | 54 | 5.6 |
| 522 | DPL $16^3$ x TX 91 BC | .44 | 60 | 6.7 |
| 532 | DPL $16^3$ x TX 78 BC | .47 | 79 | 6.2 |
| 534 | DPL $16^3$ x TX 25 BC | .39 | 77 | 7.5 |
| 540 | G8160 (Glandless Acala) | .50 | 71 | 9.3 |
| | CV (percent) | 15.9 | 43.1 | 18.6 |

| | | | | |
|---|---|---|---|---|
| | **Group 5** | | | |
| 487 | Acala SJ-2 (Test Standard) | -- | -- | 7.3 |
| 496 | DES-HERB 16 | -- | -- | 7.6 |
| 498 | DES-HAMS 16 | -- | -- | 5.0 |
| 499 | DES-HAMS 277 | -- | -- | 3.2 |
| 501 | DES-HAF 277 | -- | -- | 7.2 |
| 506 | DES-ARB 16 | -- | -- | 6.2 |
| 510 | DES-LONG 16 | -- | -- | 6.7 |
| 519 | DPL 16[3] x TX 201 BC | -- | -- | 6.1 |
| | CV (percent) | | | 23.1 |
| | **Group 6** | | | |
| 487 | Acala SJ-2 (Test Standard) | .34 | 58 | 6.3 |
| 124 | TX 44 *G. hirsutum punctatum* (Chiapas, Mexico) | .69* | 48 | 8.5 |
| 131 | 247-1-6 (High gossypol, glabrous, nectariless) | .44 | 33* | 7.1 |
| 148 | T254-24-14 (9-55-1) X-Factor | .38 | 21* | 6.6 |
| 181 | Delcot 277 | .48 | 69 | 7.4 |
| 252 | SA 19 Acala 37 (yellow anther) | .59* | 81 | 7.0 |
| 310 | SA 203 *G. barbadense* Tashkent | .34 | 65 | 6.7 |
| 483 | SA 1085 CB 3031 | -- | -- | 9.4 |
| | CV (percent) | 16.2 | 53.6 | 17.6 |

[1]Original data transformed to $(x + 0.25)^{\frac{1}{2}}$ or $(x + 0.5)^{\frac{1}{2}}$ and statistically analyzed using analysis of variance (ANOV). Retransformed means reported here.

[2]Original data statistically analyzed using ANOV.

*Significantly different from test standard at 10-percent probability level.

Note: Dashes indicate genotypes that were not entered into these lists.

Table 4.--*Growth, survival and emergence of* Lygus hesperus *nymphs in no-choice greenhouse tests. U.S. Cotton Research Station, Shafter, Calif., 1976*

| UCD No. | Genotype | Growth[1] | Survival[2] | Emergence[1] |
|---|---|---|---|---|
| | **Group 1** | | | |
| | | *Mg/day* | *Percent* | *Nymphs/ female* |
| 487 | Acala SJ-2 (Test Standard) | 0.34 | 79 | 5.7 |
| 17 | *G. arboreum* ($A_2$-15) | .46* | 75 | 4.4 |
| 23 | SA 117 Pilose | .38 | 87 | 11.4* |
| 86 | $D_2$ Smooth Leaf, glandless | .63* | 87 | 6.6 |
| 310 | SA 203 *G. barbadense* Tashkent | .26 | 71 | 6.1 |
| 616 | Texas Marker-1 (normal pilosity) | .44 | 79 | 7.0 |
| 617 | Texas Marker-1 (smooth) | .50* | 87 | 5.9 |
| 618 | Texas Marker-1 ($H_2$, very pilose) | .34 | 87 | 9.4* |
| | CV (percent) | 15.5 | 27.6 | 19.4 |
| | **Group 2** | | | |
| 487 | Acala SJ-2 (Test Standard) | .29 | 87 | 6.3 |
| 131 | 247-1-6 (High gossypol, glabrous, nectariless) | .33 | 92 | 3.6* |
| 148 | T254-24-14 (9-55-1) X-factor | .26 | 87 | 7.4 |
| 149 | T254-24-14 (9-55-7) X-factor | .22 | 92 | 7.7 |
| 567 | Lambright GL-5 (glandless) | .43* | 96 | 5.3 |
| 568 | Lambright GL-N (glandless, nectariless) | .35 | 100 | 6.9 |
| 613 | HG-BR-8-N (High gossypol, nectariless, hirsute) | .36 | 100 | 5.7 |
| 614 | HG-6-1-N (High gossypol, nectariless, hirsute) | .36 | 100 | 5.8 |
| | CV (percent) | 15.2 | 13.0 | 21.1 |

**Group 3**

| | | | | |
|---|---|---|---|---|
| 487 | Acala SJ-2 (Test Standard) | .20 | 87 | 5.5 |
| 352 | SA 373 Express 432 | .30 | 87 | 5.4 |
| 485 | Stoneville 213 | .24 | 83 | 4.6 |
| 536 | Stoneville 7A Nectariless | .29 | 83 | 6.3 |
| 537 | Stoneville 7A | .26 | 96 | 7.5 |
| 581 | H4016 (Acala SJ-1 Nectariless) | .18 | 79 | 7.0 |
| 610 | Stoneville 731N (nectariless) | .28 | 87 | 7.4 |
| 611 | H4006 (Acala SJ-1 Nectariless) | .24 | 83 | 7.3 |
| CV (percent) | | 14.2 | 22.2 | 20.7 |

**Group 4**

| | | | | |
|---|---|---|---|---|
| 487 | Acala SJ-2 (Test Standard) | .27 | 92 | 5.8 |
| 489 | Acala SJ-4 | .31 | 92 | 3.6 |
| 525 | DPL $16^3$ x TX 80 BC | .38 | 75 | 5.4 |
| 527 | DPL $16^3$ x TX 100 BC | .39 | 83 | 4.5 |
| 530 | DPL $16^3$ x TX 158 BC | .44 | 87 | 5.4 |
| 531 | DPL $16^3$ x TX 209 BC | .38 | 92 | 5.6 |
| 532 | DPL $16^3$ x TX 78 BC | .40 | 83 | 4.7 |
| 615 | T6892 (Verticillium Wilt Resistant) | .36 | 92 | 5.6 |
| CV (percent) | | 12.8 | 21.3 | 24.2 |

See footnotes at end of table.

Table 4.--*Growth, survival and emergence of* Lygus hesperus *nymphs in no-choice greenhouse tests. U.S. Cotton Research Station, Shafter, Calif., 1976*--Continued

| UCD No. | Genotype | Growth[1] | Survival[2] | Emergence[1] |
|---|---|---|---|---|
| | **Group 5** | | | |
| | | *Mg/day* | *Percent* | *Nymphs/ female* |
| 487 | Acala SJ-2 (Test Standard) | 0.28 | 71 | 4.8 |
| 504 | DES-ANOM 16 | .39* | 92 | 5.4 |
| 518 | DPL $16^3$ x TX 113 BC | .29 | 87 | 3.9 |
| 515 | DPL $16^3$ x TX 195 BC | .39* | 87 | 5.3 |
| 603 | DPL $16^3$ x TX 158 BC | .33 | 87 | 3.9 |
| 605 | OR-37-72 | .44* | 92 | 6.7 |
| 606 | ORH-55-73 | .37 | 87 | 5.2 |
| 609 | Bulgaria 3279 | .30 | 87 | 4.6 |
| | CV (percent) | 13.5 | 21.4 | 32.7 |

[1]Original data transformed to $(x + 0.25)^{\frac{1}{2}}$ or $(x + 0.5)^{\frac{1}{2}}$ and statistically analyzed using analysis of variance (ANOV). Retransformed means reported here.

[2]Original data statistically analyzed using ANOV.

*Significantly different from test standard at 10-percent probability level.

Table 5.--*Mean number of* Lygus hesperus *Knight in no-choice field cages on various nectaried and nectariless lines, U.S. Cotton Research Station, Shafter, Calif., 1976*[1]

| UCD No. | Genotype | Mean bugs per cage[2] |
|---|---|---|
| 581 | H4016 (Acala SJ-1 nectariless) | 25.3a |
| 611 | H4006 (Acala SJ-1 nectariless) | 28.1ab |
| 539 | DPL-16 (nectaried) | 33.5ab |
| 237 | Acala SJ-1 (nectaried) | 38.3 b |
| 536 | Stoneville 7A Nectariless | 39.6 b |
| 538 | DPL-16 Nectariless | 42.2 b |
| 537 | Stoneville 7A (nectaried) | 65.7 c |
| | Mean for nectariless lines | 33.0* |
| | Mean for nectaried lines | 43.9 |

[1]Analysis of variance performed on log (x + 0.5) data. Means reported are retransformed.

[2]Means followed by the same letter are not significantly different at P = 0.1 level based on mean separation by LSD of log (x + 0.5) data.

*The mean for all nectariless lines is significantly different (P = 0.5) from the mean for all nectaried lines.

Table 6.--*Mean total bolls counted in* Lygus hesperus *Knight Check (C) and Infested (I) plots, and the boll count ratio (I/C) of 29 cotton genotypes, U.S. Cotton Research Station, Shafter, Calif., 1976*

| UCD No. | Genotype | Check | Infested | Ratio I/C |
|---|---|---|---|---|
| 515 | DPL $16^3$ x TX 195 BC | 579 | 584 | 1.01 |
| 353 | SA 378 (Stoneville 7A x Hopi 11-1-1-4) | 486 | 487 | 1.00 |
| 483 | SA 1085 CB 3031 | 435 | 431 | .99 |
| 309 | SA 202 Marshall | 581 | 574 | .99 |
| 537 | Stoneville 7A | 570 | 550 | .96 |
| 480 | SA 1080, 942 | 555 | 525 | .95 |
| 531 | DPL $16^3$ x TX 209 BC | 606 | 569 | .94 |
| 123 | TX 27 x M8 (1-21) | 611 | 565 | .93 |
| 349 | SA 357 Mexican B.B. | 341 | 315 | .93 |
| 516 | DPL $16^3$ x TX 25 BC | 711 | 662 | .93 |
| 418 | SA 631 CB 2540 | 456 | 423 | .93 |
| 179 | Triple Hybrid 149 | 436 | 404 | .93 |
| 520 | DPL $16^3$ x TX 69 BC | 592 | 547 | .92 |
| 517 | DPL $16^3$ x TX 59 BC | 648 | 594 | .92 |
| 487 | Acala SJ-2 (Test Standard) | 537 | 494 | .92 |
| 535 | DPL $16^3$ x TX 84 BC | 628 | 574 | .91 |
| 131 | 247-1-6 (High gossypol, glabrous, nectariless) | 1045 | 947 | .91 |
| 409 | SA 590 Sealand 7 Yellow Flower | 584 | 527 | .90 |
| 524 | DPL $16^3$ x TX 223 BC | 676 | 611 | .90 |
| 382 | SA 478 Green Brown 7 (Nankeen) | 590 | 522 | .89 |
| 228 | Stoneville 7A Frego bract | 693 | 607 | .88 |
| 324 | SA 253 (Coker's Clevewilt 3) | 573 | 505 | .88 |
| 536 | Stoneville 7A Nectariless | 621 | 540 | .87 |
| 142 | M8 x TX 27 (1-21-6-10) | 395 | 344 | .87 |
| 527 | DPL $16^3$ x TX 100 BC | 693 | 565* | .81 |
| 540 | G8160 (Glandless Acala) | 532 | 420* | .79 |
| 521 | DPL $16^3$ x TX 88 BC | 685 | 529* | .77 |
| 529 | DPL $16^3$ x TX 75 BC | 736 | 553* | .75 |
| 148 | T254-24-14 (9-55-1) X-Factor | 478 | 321* | .67 |

*Boll number in infested plots is significantly (P = .10) less than that in the check plots. LSD 10 percent = 103.

Table 7.--*Mean total bolls counted in* Lygus hesperus *Knight Check (C) and Infested (I) plots and the boll count ratio (I/C) of 40 cotton genotypes, U.S. Cotton Research Station, Shafter, Calif., 1976*

| UCD No. | Genotype | Check | Infested | Ratio I/C |
|---|---|---|---|---|
| 150 | Atrophied bract (320551, 1968) | 284 | 402 | 1.42 |
| 515 | DPL $16^3$ x TX 195 BC | 467 | 624* | 1.34 |
| 504 | DES-ANOM 16 | 591 | 742* | 1.25 |
| 581 | H4016 (Acala SJ-1 Nectariless) | 377 | 468 | 1.24 |
| 507 | DES-ARB 277 | 555 | 673 | 1.21 |
| 228 | Stoneville 7A Frego bract | 580 | 675 | 1.16 |
| 505 | DES-ANOM 277 | 573 | 613 | 1.07 |
| 502 | DES-TOM 16 | 658 | 681 | 1.03 |
| 509 | DES-BARB 277 | 517 | 522 | 1.01 |
| 613 | HG-BR-8-N (High gossypol, nectariless, hirsute) | 772 | 769 | 1.00 |
| 496 | DES-HERB 16 | 704 | 707 | 1.00 |
| 242 | TX 404 (Hopi N. Mex. 1239) | 853 | 846 | .99 |
| 541 | Acala SJ-5 | 507 | 490 | .97 |
| 609 | Bulgaria 3279 | 448 | 436 | .97 |
| 518 | DPL $16^3$ x TX 113 BC | 686 | 661 | .96 |
| 487 | Acala SJ-2 (Test Standard) | 517 | 491 | .95 |
| 614 | HG-6-1-N (High gossypol, nectariless, hirsute) | 588 | 555 | .94 |
| 605 | OR-37-72 | 467 | 435 | .93 |
| 501 | DES-HAF 277 | 620 | 580 | .93 |
| 506 | DES-ARB 16 | 671 | 627 | .93 |
| 497 | DES-HERB 277 | 620 | 563 | .91 |
| 503 | DES-TOM 277 | 620 | 566 | .91 |
| 606 | ORH-55-73 | 574 | 514 | .90 |
| 508 | DES-BARB 16 | 694 | 626 | .90 |
| 136 | H7020-1 (Triple Hybrid bulkcross #2, 1952) | 273 | 246 | .90 |
| 491 | PIMA S-4 ($Gl_2Gl_2Gl_3Gl_3$) | 450 | 394 | .88 |
| 500 | DES-HAF 16 | 586 | 519 | .88 |
| 489 | Acala SJ-4 | 540 | 474 | .88 |
| 532 | DPL $16^3$ x TX 78 BC | 677 | 589 | .87 |
| 504 | DES-ANOM 16 | 672 | 577 | .86 |
| 151 | H7001-1 (Tanguis x Acala $4\text{-}42^4$ 8C) | 683 | 586 | .86 |
| 488 | Acala SJ-3 | 540 | 451 | .83 |
| 603 | DPL $16^3$ x TX 158 BC | 797 | 655 | .82 |
| 498 | DES-HAMS 16 | 743 | 592* | .80 |
| 310 | SA 203 *G. barbadense* Tashkent | 1021 | 810* | .79 |
| 611 | H4006 (Acala SJ-1 nectariless) | 719 | 557* | .77 |
| 540 | G8160 (Glandless Acala) | 583 | 443 | .76 |
| 124 | TX 44 *G. hirsutum punctatum* (Chaipas, Mexico) | 849 | 595* | .70 |
| 122 | Tanguis 3807 | 1321 | 757* | .57 |
| 180 | Acala P18C | 729 | 337* | .46 |

*Boll number in infested plots is significantly (P = .10) different from that in the check plots. LSD 10 percent = 143.

Table 8.--*Mean total bolls counted in* Lygus hesperus *Knight Check (C) and Infested (I) plots and the boll count ratio (I/C) of 41 cotton genotypes, U.S. Cotton Research Station, Shafter, Calif., 1976*

| UCD No. | Genotype | Check | Infested | Ratio I/C |
|---|---|---|---|---|
| 563 | Paymaster 131 x 144 glandless | 433 | 554 | 1.28 |
| 562 | Rex Smoothleaf 69-1 glandless | 453 | 566 | 1.25 |
| 544 | C-S gs 74-703 glandless | 504 | 590 | 1.17 |
| 559 | Gregg 45E Glandless | 477 | 523 | 1.10 |
| 575 | G4078 glandless | 524 | 572 | 1.09 |
| 553 | Stoneville 418 G1 glandless | 571 | 614 | 1.07 |
| 558 | Lyman 18-74 glandless | 462 | 474 | 1.03 |
| 577 | G0126 Acala glandless | 497 | 507 | 1.02 |
| 567 | Lambright GL-5 (glandless) | 436 | 443 | 1.02 |
| 487 | Acala SJ-2 Glanded (Test Standard) | 599 | 595 | .99 |
| 557 | Lyman-BR-74C glandless | 461 | 450 | .98 |
| 554 | La. 68-29 (HxFxA) glandless | 652 | 636 | .98 |
| 549 | Lankart 57 Glandless | 453 | 436 | .96 |
| 569 | g 966 glandless | 609 | 586 | .96 |
| 551 | Auburn M Glandless | 599 | 576 | .96 |
| 579 | Acala 63-74 glandless | 428 | 403 | .94 |
| 542 | 1-756 glandless | 663 | 617 | .93 |
| 550 | Stardel Glandless | 700 | 637 | .91 |
| 546 | Stoneville 7A Glandless | 660 | 592 | .90 |
| 564 | Paymaster 160 x 131 glandless | 532 | 478 | .90 |
| 571 | g 800 glandless | 614 | 543 | .88 |
| 561 | Lockett 22-9 glandless | 586 | 511 | .87 |
| 548 | Coker 100A Glandless | 638 | 557 | .87 |
| 540 | G8160 Glandless Acala | 605 | 521 | .86 |
| 547 | DPL-SL Glandless | 587 | 502 | .86 |
| 612 | Lockett 22-6 glandless | 581 | 492 | .85 |
| 560 | Rogers GL6 glandless | 520 | 437 | .84 |
| 568 | Lambright GL-N (glandless, nectariless) | 572 | 482 | .84 |
| 543 | C-S gs. 711, 71-704 glandless | 763 | 626 | .82 |
| 573 | Pima 73-4137 glandless | 638 | 507 | .80 |
| 574 | G4069 glandless | 505 | 397 | .79 |
| 572 | g 845 glandless | 683 | 530 | .78 |
| 545 | Pope Glandless | 615 | 475 | .77 |
| 570 | g 1015 glandless | 569 | 430 | .75 |
| 565 | McNair 3051 glandless | 503 | 379 | .75 |
| 555 | 51F092 Glandless Parrott | 626 | 471 | .75 |
| 552 | Stoneville 519 G1 glandless | 657 | 483* | .74 |
| 578 | Acala 63-69 glandless | 471 | 338 | .72 |
| 576 | G4093 Acala glandless | 538 | 363* | .67 |
| 228 | Stoneville 7A Frego bract | 738 | 467* | .63 |
| 556 | M73-076 glandless | 582 | 367* | .63 |

*Boll number in infested plots is significantly (P = .10) less than that in the check plots. LSD 10 percent = 157.

## GLOSSARY

***Antibiosis***...A toxic or other direct detrimental effect of one organism on another.

***Dialysis tube***...A tube made of semipermiable cellophane membrane.

***Genotype***...The genetic constitution of an organism; a group or organisms with the same genetic makeup; a line, strain or cultivar.

***Glandless***...Devoid of the small lysigenous pigment glands normally found on cotton plants.

***Isogenic***...Differing genetically only at one locus.

***Isolines***...Lines that are isogenic.

***Nectariless***...Devoid of leaf and extra floral nectaries.

***Nonpreference***...The behavior of insects when they avoid or exhibit negative reactions to a plant of a host species; a resistance trait that induces such behavior.

***Pilose***...With long, soft, spreading hairs; densely covered with hairs; hairy.

***Preanthesis***...Prior to dehiscence of the anthers or pollen shedding.

***Sympodial***...Fruiting branch made up of successive secondary axes each of which represents one fork of a dichotomy the other fork of which is suppressed entirely.

***Tolerance***...Ability of a plant to withstand infestation and to support insect populations that would severely damage susceptible plants.

***Trichome***...A plant hair thrice divided.

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